Amendments to the Claims

Please cancel Claims 5-7. Please amend Claims 1-4, 8, 9, 12 and 13-17. Please add new Claims 18-24. The Claim Listing below will replace all prior versions of the claims in the application:

Claim Listing

1. (Currently amended) A method of removing contaminants from a stream of carbon dioxide (CO_2), comprising:

contacting a stream of CO_2 with a quantity of at least one mixed metal oxide for a period of time to reduce the contaminant content of the stream, wherein the mixed metal oxide includes: iron (Fe) and manganese oxide (MnO_x); nickel oxide (NiO) and titanium oxide (TiO_X); palladium oxide (PdO_x) and cerium oxide (CeO_x); vanadium oxides (VO_x); nickel (Ni) and nickel oxide (NiO); or iron oxides (Fe_xO_y).

2. (Currently amended) The method of ~~as in~~ claim 1, wherein the contaminant content is reduced to not more than 100 parts per billion (ppb).

3. (Currently amended) The method of ~~as in~~ claim 1, wherein the contaminant content is reduced to not more than 10 ppb.

4. (Currently amended) The method of ~~as in~~ claim 1, wherein the contaminant content is reduced to not more than 1 ppb.

5-7. Canceled

8. (Currently amended) The method of claim 1, wherein ~~the mixed metal oxide comprises copper (Cu) and zinc oxide (ZnO); iron (Fe) and manganese oxide (MnO_x); nickel oxide (NiO) and titanium oxide (TiO_x); palladium oxide (PdO_x) and cerium oxide (CeOx); and vandium oxide (VO_x)~~ the mixed metal oxide includes: iron (Fe) and a manganese oxide

selected from the group consisting of MnO and MnO_2; vandium oxides selected from the group consisting of VO, VO_2, V_2O_3 and V_2O_5; nickel (Ni) and nickel oxide (NiO); or FeO and Fe_2O_3.

9. (Currently amended) A method for activation and regeneration of mixed metal oxide adsorbents for the purification of carbon dioxide (CO_2) comprising:

heating [[the]] a mixed metal oxide adsorbent that has been used for the purification of carbon dioxide to a first temperature to release contaminants adsorbed thereto, wherein the adsorbent includes at least one mixed metal oxide, the mixed metal oxide including: iron (Fe) and manganese oxide (MnO_x); nickel oxide (NiO) and titanium oxide (TiO_X); palladium oxide (PdO_x) and cerium oxide (CeO_x); vanadium oxides (VO_x); nickel (Ni) and nickel oxide (NiO); or iron oxides (Fe_xO_y);

exposing the adsorbent to an oxidizing agent to oxidize the adsorbent;

cooling the oxidized adsorbent to a second temperature; and

exposing the cooled adsorbent to a reducing agent to produce a mixed metal oxide usable for the purification of carbon dioxide (CO_2).

10. (Original) The method of claim 9, wherein the first temperature is between about 300°C to about 550° C.

11. (Original) The method of claim 10, wherein the first temperature is about 400°C.

12. (Currently amended) The method of ~~as in~~ claim 9, wherein the oxidizing agent comprises oxygen (O_2).

13. (Currently amended) The method of ~~as in~~ claim 9, wherein the second temperature is between about 100°C to about 250°C.

14. (Currently amended) The method of ~~as in~~ claim 9, wherein the reducing agent comprises a mixture of hydrogen (H_2) and an inert gas.

15. (Currently amended) The method of ~~as in~~ claim 14, wherein the hydrogen gas comprises between about 1% to about 5% of the mixture by volume.

16. (Currently amended) The method [[in]] of claim 14, wherein the inert gas is selected from the group consisting of nitrogen (N_2) and argon and combinations thereof.

17. (Currently amended) A method for continuous purification of carbon dioxide (CO_2), comprising:

a) purifying ~~purification of~~ CO_2 by contacting a stream of CO_2 with a quantity of at least one mixed metal oxide for a period of time to reduce a contaminant content of the stream ~~by the method of claim 1~~ in a first bed of a dual bed purifier apparatus;

b) regenerating ~~regeneration of~~ an adsorbent in a second bed of the dual bed purifier apparatus by heating the adsorbent to a first temperature to release contaminants adsorbed thereto; exposing the adsorbent to an oxidizing agent to oxidize the adsorbent; cooling the oxidized adsorbent to a second temperature; and exposing the cooled adsorbent to a reducing agent to produce a mixed metal oxide during the coincident purification of the CO_2 in the previous step; followed by

c) purifying ~~purification of~~ CO_2 as in step a in the second bed after completion of regeneration of the adsorbent as in step b, coincident with the regeneration of the adsorbent of the first bed; and

d) repeating [[the]] steps a) – c) for continuous purification.

18. (New) The method of Claim 1, wherein the mixed metal oxide includes nickel (Ni) and nickel oxide (NiO).

19. (New) The method of Claim 9, wherein the mixed metal oxide includes: iron (Fe) and manganese oxide selected from the group consisting of MnO and MnO_2; vandium oxides

selected from the group consisting of VO, VO_2, V_2O_3 and V_2O_5; nickel (Ni) and nickel oxide (NiO); or FeO and Fe_2O_3.

20. (New) The method of Claim 19, wherein the mixed metal oxide includes nickel (Ni) and nickel oxide (NiO).

21. (New) The method of Claim 17, wherein the mixed metal oxide includes: iron (Fe) and manganese oxide (MnO_x); nickel oxide (NiO) and titanium oxide (TiO_X); palladium oxide (PdO_x) and cerium oxide (CeO_x); vanadium oxides (VO_x); nickel (Ni) and nickel oxide (NiO); or iron oxides (Fe_xO_y).

22. (New) The method of Claim 21, wherein the mixed metal oxide includes: iron (Fe) and manganese oxide selected from the group consisting of MnO and MnO_2; vandium oxides selected from the group consisting of VO, VO_2, V_2O_3 and V_2O_5; nickel (Ni) and nickel oxide (NiO); or FeO and Fe_2O_3.

23. (New) The method of Claim 22, wherein the mixed metal oxide includes nickel (Ni) and nickel oxide (NiO).

24. (New) A method for activation and regeneration of a mixed metal oxide adsorbent for the purification of carbon dioxide (CO_2), comprising:

heating a mixed metal oxide adsorbent that has been used for the purification of carbon dioxide to a first temperature to release contaminants adsorbed thereto;

exposing the adsorbent to an oxidizing agent to oxidize the adsorbent;

cooling the oxidized adsorbent to a second temperature; and

exposing the cooled adsorbent to a reducing agent to produce a mixed metal oxide usable for the purification of carbon dioxide (CO_2), wherein the reducing agent comprises a mixture of hydrogen (H_2) and an inert gas, and wherein the hydrogen gas comprises between about 1% to about 5% of the mixture by volume.